Critical Success Factors of CAD Data Migrations
Organizations implement PLM systems with several goals in mind: to better manage corporate assets, bring products to market faster, meet competitive challenges, and satisfy customer needs. CAD data migration is an essential element of any PLM system implementation. A successful migration enables companies to increase their productivity by providing better access to—and control of—their design data.

The CAD Data Migration (CDM) portion of a Product Lifecycle Management (PLM) implementation represents one of the highest reward—yet highest risk—activities of a PLM deployment. During this process, it is critical to maintain accuracy and accessibility of legacy data, however, organizations may lack the proper planning necessary or utilize resources with inadequate domain expertise to handle this complex task. Consequently, poorly planned and executed data migrations lead to cost overruns, project delays, and potential data corruption, among other issues. Fortunately, much of this risk can be mitigated with a thorough and properly formed CDM Analysis & Planning project.

With CDM Analysis & Planning, organizations not only reap the benefits of reduced project risks, they can also cut costs, avoid project delays, as well as minimize business disruptions. While strategies for approaching this process may differ from one company to the next, common factors exist that affect the success of all migration projects. With over fifteen years of experience in performing complex data migrations, I-Cubed has identified eight critical success factors common to successful CDM projects using proper analysis and planning procedures.

This paper identifies the eight critical success factors for CDM, explains the consequences for not properly addressing each, and highlights the value derived from leveraging an expert to guide the process.

Introduction: Preparation is the Key

When an organization is not thoroughly prepared to undertake a data migration, the process quickly becomes overwhelming. This is due to the series of unforeseen pitfalls that will emerge when migrating legacy data from one system to another without proper planning. To better anticipate and navigate these pitfalls, organizations should undertake a CDM Analysis & Planning project to ensure the eight critical steps below are followed:

1. Identify the appropriate personnel
2. Understand CAD data migration complexity
3. Assess the value of historical data
4. Understand target system requirements
5. Create a comprehensive migration plan
6. Identify and assess risks
7. Utilize the appropriate migration tools
8. Obtain expert guidance
The Top Success Factors of CAD Data Migration

Success Factor #1 – Dedicate the Appropriate Personnel

To ensure CAD data accuracy and usability after migration, organizations must identify project personnel who have complete ownership and responsibility for the data prior to, during, and following deployment. This normally requires involvement from the following personnel:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager</td>
<td>The person(s) with complete project ownership from start to finish.</td>
</tr>
<tr>
<td>CAD Administrator</td>
<td>The person with in-depth knowledge of the existing data and the ways in which the company plans to use it after migration.</td>
</tr>
<tr>
<td>Data Migrator</td>
<td>The person responsible for actually migrating the data.</td>
</tr>
<tr>
<td>IT Operations Specialist</td>
<td>The person responsible for providing access to the network environment, performing backups, and installing and maintaining necessary hardware and software updates.</td>
</tr>
</tbody>
</table>

In addition to identifying appropriate personnel to a migration project, project managers should not ignore the importance of educating upper management regarding data migration procedures. Management buy-in makes it easier to obtain organizational support, allowing for the migration to proceed in a credible and expedient manner.

Success Factor #2 – Understand CAD Data Migration Complexity

In order to successfully migrate legacy data, the migration team must maintain the integrity of relationships between CAD files. These relationships frequently become complex, as in the following examples:

1. Organizations store CAD data in files that represent interrelated networks of files (i.e. assemblies, subassemblies, family tables, etc.)
2. Files contain parts that are used by many assemblies
3. CAD documents have a long history of revisions

Each of these examples adds complexity to a data migration. Even though PLM systems have a multifaceted data model designed to handle heterogeneous relationships, a CAD data migration must catalog all of the legacy systems for effective use with PLM systems.
Many organizations initially oversimplify their view of data migration, assuming they can merely extract data from source databases and populate it into a target database. Yet, once they delve into PLM system functionality, they recognize the effort required to maintain and manage data integrity in response to their unique business requirements.

Success Factor #3 – Assess the Value of Historical Data

To identify information that is worth migrating, the migration team must understand the data requirements of the business including the organization’s business model and PLM system use.

The team must define what historical information it needs to retain and how it will be used in the course of business operations. This will enable the team to differentiate between high-value data and data that has lost its significance over time. Many organizations initially seek to migrate all their data even if much of it is obsolete and/or non-critical. This adds unnecessary complexity to an already complex process.

Migration teams can ignore a long list of data types during migration.

Following are several examples of data that may not warrant migration:

- Intermediate iterations of files between releases
- Attributes that add no real value to a PLM system
- Historical revisions that can be accessed via an archive system (“full history” migration can take 10-100 times longer than “latest only” migration).

Fortunately, most PLM systems are web-based and include indexing and search functionality. This reduces the need for complex folder structures and simplifies data migration.

Success Factor #4 – Understand Target System Requirements

Any PLM system, controlling all CAD data as well as other product data, has certain requirements for the data. These include data cleanliness, completeness, and compatibility. Not meeting these critical data preparation requirements can cause a PLM system to fail, resulting in cost and time overruns.

The cleansing process involves repairing corrupt data or invalid records, renaming files, verifying family table instances, and removing the many variations of duplicates. The goal of cleansing is to both clean the data and increase consistency and completeness in data that is merged from separate databases. This means that the migration team must load all family table instances as PLM system objects, identify missing dependencies, and utilize a consistent set of parameters in the models. Moreover, the data must be compatible with the tools that use it. This is due to the PLM system’s intricate structure which relies on the team to populate data in a specified manner. Incompatible data may become unusable by one or more tools over time.
Success Factor #5 – Create a Comprehensive Migration Plan

A product company’s design data represents its most significant and valuable asset. This is why migration teams must undertake meticulous planning and develop a comprehensive migration plan to avoid potential data loss, ensure reduced downtime, and minimize user disruption. Any data migration will impact a portion of users; the key is to plan a migration that impacts as few as possible.

A comprehensive migration plan should include the following items:

- Scoping of the project
- Description of data migration process (tools, procedures and resources)
- Identification of risks associated with data migration
- Testing
- Time estimates of project phases
- Validation process
- Contingency procedures

Success Factor #6 – Identify and Assess Risks

Data migration is a substantial process that can take several months to complete. Even with scrupulous planning, unforeseen issues can arise. The key to successful data migration is to anticipate and plan for risks. This will help to avoid major delays in the migration schedule that can impact critical business processes.

Areas that frequently introduce risk include the following

- Required attributes and metadata
- Numbering and naming schemes
- Legacy information requirements

The more potential risks that are identified at the outset, the better the odds of minimizing their impact on the process.

Success Factor #7 – Utilize the Appropriate Migration Tools

There are several ways to migrate data into a new PLM system. They include manual loading, custom scripting, and bulk loading via software. Migration teams will need to weigh the advantages and disadvantages of each approach based upon their organization’s specific needs.

Manual loading enables a fast migration for organizations that have a small amount of data stored in homogeneous databases. On the other hand, migrations that require management of thousands of interrelated CAD files make manual loading ineffective, time-consuming, and expensive. It also introduces considerable risk associated with misread data, incorrect data entry, misplaced data (wrong fields), and data omission.
The second option, custom scripting, usually appears attractive for development, testing, and validation during the planning stage. However, once implemented, the nature of custom programming (e.g., try, fail, and try again) can cause delays, divert resources, and hinder the overall PLM system implementation. Additionally, when scripts malfunction or require modification, migration teams quickly incur unanticipated consulting costs and schedule delays. Overall, custom scripts lower the odds of achieving data compatibility in a reasonable timeframe, while data integrity issues remain undetected.

CAD data migration bulk loading software offers the best support for heterogeneous CAD storage environments. This option eliminates the risks associated with data compatibility, cost, and scheduling. In addition, bulk loading software enables teams to maintain system availability and full data integrity without impacting application performance or disrupting users.

**Success Factor #8 – Obtain Expert Guidance**

The most expeditious and practical way for any team to undertake a data migration project is to include a professional migration consultant. Such collaboration ensures project success while avoiding the costly delays attributed to an insufficient migration strategy. A migration consultant will conduct a migration assessment and provide documented recommendations for the most complex areas of a migration, including the following:

- Data Preparation/Cleansing
- Load Sequencing and Scheduling
- Configuration
- Customization Points
- Training Requirements

Highly qualified migration consultants provide a deliberate planning approach that helps teams to set the appropriate expectations for deliverables. Consultants will also enhance execution by establishing roles and responsibilities in the services process. Their involvement from the outset can help mitigate much of the frustration that teams experience when attempting to overcome the inherent complexities of the data migration process.
To optimize people and resources, organizations migrate their engineering data from old CAD systems to a new PLM system. There are eight critical success factors to CAD data migration that all organizations should consider prior to launching their migration process. Those factors, summarized below, will help an organization save time, cost and resources while increasing the ROI of their PLM system implementation.

Success Factor #1 – Dedicate the Appropriate Personnel
Assign the appropriate personnel to a data migration project to minimize downtime and avoid large-scale user disruption.

Success Factor #2 – Understand CAD Data Migration Complexity
Perform a complete assessment of the complexity of a CAD data migration to help set expectations for upper management and ensure their buy-in throughout the process.

Success Factor #3 – Assess the Value of Historical Data
Identify data that provides high value and those that have lost their significance. Migrate only the essential data to reduce complexity and streamline the migration process.

Success Factor #4 – Understand Target System Requirements
With any PLM system, controlling all CAD data as well as other product data has certain preparation requirements including data cleanliness, completeness, and compatibility. Not addressing these critical data requirements can cause a PLM system to fail, resulting in cost and time overruns.

Success Factor #5 – Create a Comprehensive Migration Plan
Meticulous planning for and deployment of a comprehensive migration plan will ensure the corporation’s data is properly migrated.

Success Factor #6 – Identify and Assess Risks
The key to successful data migration is to anticipate and plan for risks. This will help to avoid major delays in the migration schedule that can impact critical business processes.

Success Factor #7 – Utilize the Appropriate Migration Tools
Bulk loading migration software enables organizations to maintain system availability and complete data integrity while minimizing the effects on application and user performance. It provides the most benefit to organizations with heterogeneous storage environments.

Success Factor #8 – Obtain Expert Guidance
Highly qualified migration consultants have performed hundreds of data migrations. Organizations should leverage that expertise to navigate the complexities of the migration process and ensure project success on the first attempt.
Success Factor #8 – Obtain Expert Guidance

The most expeditious and practical way for any team to undertake a data migration project is to include a professional migration consultant. Such collaboration ensures project success while avoiding the costly delays attributed to an insufficient migration strategy. A migration consultant will conduct a migration assessment and provide documented recommendations for the most complex areas of a migration, including the following:

**Data Migration Services**
- CAD data migration analysis & planning
- CAD data migration consulting & delivery

**Managed Services**
- Enterprise Application Support--Remote administration for Windchill
- Windchill hosting

**PLM Products**
- Tech Notes--Advanced PTC® Windchill® note management
- Profiler--CAD data analysis
- Legend--Robust data migration solution
- CADi for Solid Edge--Integration of Windchill with Solid Edge

**Consulting Services**
- Solution design
- Implementation
- Training & mentoring
- Project management

To find out more about I-Cubed’s solutions and services, please visit www.i-cubed.com.